

# 30HA Standard/Master 30HA Standard I/Master I



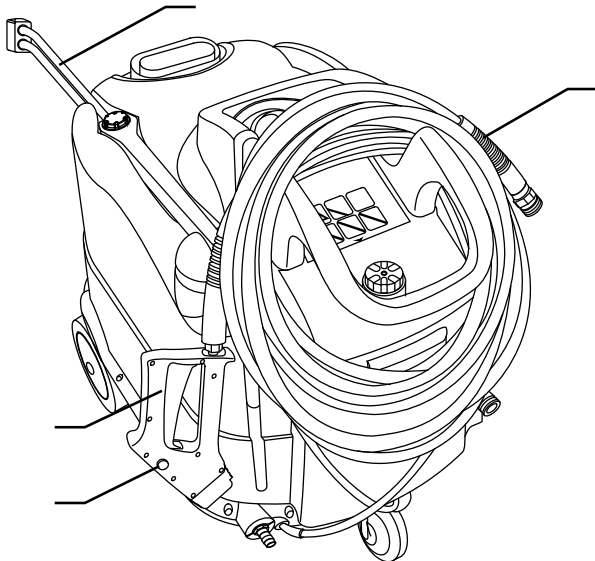
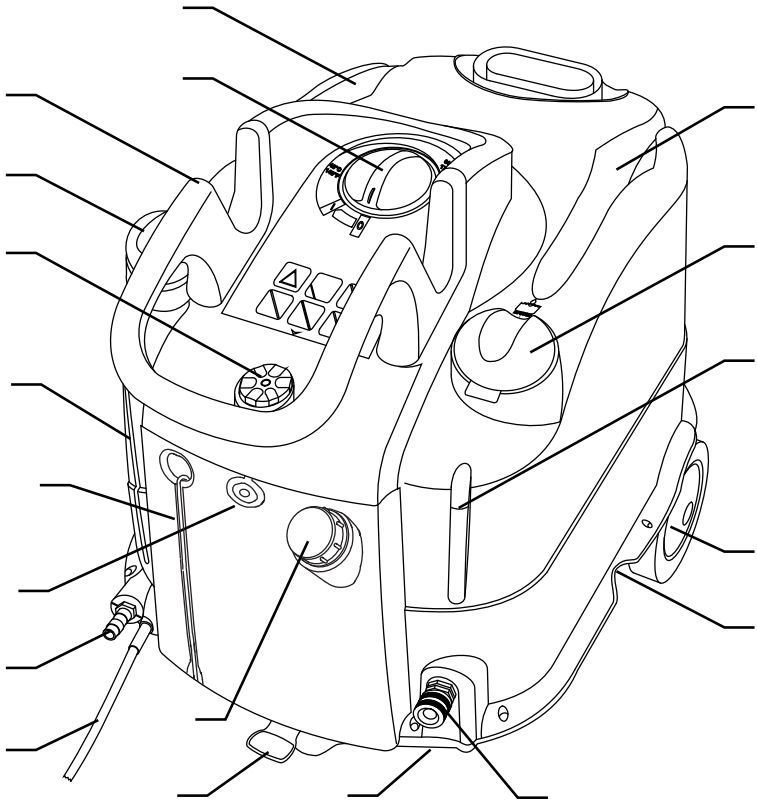
ALTO®

Total Cleaning  
Confidence™

**IMPORTANT:** For your own safety and that of others, please make certain that everyone who uses the 30HA Standard/Master hot water high pressure washer reads and understands these instructions thoroughly prior to operation.

US Owner's manual

WAP  
KEW  
TECHNOLOGIES



## Congratulations!

We'd like to say, "Thank you!" for choosing one of the ALTO 30HA series machines. This operator's manual is provided with your new high pressure washer to ensure that you obtain the best results, in the safest manner, with your new machine.

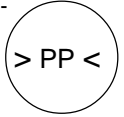
**IMPORTANT:** This machine is a High Pressure Washer, capable of producing as much as 2100 psi. Read this manual completely, before operating the machine. A complete understanding of the material in this manual will help you avoid possible injury or damage to other objects, as well as damage to the machine, itself.

## ALTO's environmental policy

Most of the plastic parts of this model are recycleable, and they have been marked with a recycling symbol and the type of material, (i.e. PP).

It is also a part of our concern for environmental problems that the pressure washer is maintenance-free, meaning that the oil in the high pressure pump will not have to be changed regularly. The oil is in a closed system and is only changed when an eventual service event occurs.

For the production of this high pressure washer the latest technique and technology has been applied. During the final test of the product, the test water is recycled.



**IMPORTANT: Read this instruction manual before you start up your high pressure washer for the first time.**

This machine is a hot water high pressure washer producing a water jet under high pressure and of a high temperature which is why severe injuries and scalding can occur if the safety precautions are not observed. Therefore a complete understanding of the contents of this instruction manual is required in order to prevent injuries to yourself, objects and persons near-by, and the machine itself.

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## Designations

(see drawing on the cover)

- 1. Connection for high pressure hose
- 2. Water connection (water inlet screen)
- 3. Power cord
- 4. Fuel filler port (fuel filter)
- 5. Fuel level indicator
- 6. Hot water high pressure hose
- 7. Spray handle
- 8. Safety locking device
- 9. Spray lance
- 10. Metering unit for detergents
- 11. Compartment for detergent container
- 12. Pickup hose for detergents
- 13. Filler port for "No Scale"
- 14. Level indicator for "No Scale"
- 15. Pressure gauge
- 16. Operation knob
- 17. Handle with hose/cable holder
- 18. Holder for spray lance
- 19. Caster wheel with brake
- 20. Main wheel
- 21. Model tag

### NOTE !

It may be necessary to re-adjust the burner if the machine is to be used at an elevation of more than 3000 ft. This adjustment must be made by an ALTO-trained service technician.

At ALTO we endeavour to prepare the instruction manuals for our products in the best possible way. But we know that they can always be better, so if you have any comments or proposals for improvement, we should be pleased to hear from you. Please forward your comments to:

*ALTO Danmark A/S, "Manuals", Industrivartheret, DK-9560 Hadsund .*

# 1.0 Technical data

Model		30HA	30HA
		Standard I/Master I	Standard I/Master I
Working pressure	psi	1100	2100
Permissible overpressure	psi	1600	2300
Volumetric flow	USgal	2.2 / 2.0	2.5 / 2.3
Max. temperature, inlet water	°F	85	85
Rated power	kW	1,4	3,0
Fuse	A	14.5	12.5
Water temperature	°F	176 (Standard)/302 (Master)	176 (Standard)/302 (Master)
Protection class		F	F
Type of protection		IP X5	IP X5
Water volume of the heater coil	USg	0.8	0.8
Heating capacity	kW	37	38
Fuel tank capacity	USgal	4	4
Cleaning agent tank capacity	USgal	2	2
Permissible water inlet pressure	psi	15-145	15-145
Dimensions L x W x H	in.	34 x 23 x 30	34 x 23 x 30
Mahine weight	lb	187	187
Recoil forces	N	14	19

Please observe the technical data on the rating plate!

- 1) Voltage 115 V 1~, 60 Hz
- 2) Voltage 220 V 1~, 60 Hz

Sound pressure level  $L_{pA}$  measured in accordance with ISO 11202 [DISTANCE 1m] [FULL LOAD]:  
82 dB(A).

Data obtained with 54°F inlet water temperature.

We reserve the right to make alterations.

## 2.0 Instructions for use

## Safety precautions and warnings

Before starting your high pressure washer for the first time, we advise you to read through the following sections: **2.0 Instructions for use** and **3.0 Operating instructions** and to follow all instructions to ensure the protection of user, surroundings and machine.

**- WARNING -**  
Risk of Injection or Severe Injury -  
Keep Clear of Nozzle -  
Do not Direct Discharge Stream at Persons -  
This Product Is To Be Used Only By Trained Operators.

The high water pressure from a high pressure washer may cause personal injury or property damage if the following „IMPORTANT SAFETY INSTRUCTIONS“ are not strictly observed.

### IMPORTANT SAFETY INSTRUCTIONS

#### - WARNING -

When using this product, basic precautions should always be followed, including the following:

1. Read all of the instructions before using the product.
2. To reduce the risk of injury, close supervision is necessary when the pressure washer is used near children.
3. Know how to stop the product. Be thoroughly familiar with all the controls.
4. Stay alert - watch what you are doing.
5. Do not operate the product when fatigued or under the influence of alcohol or drugs.
6. Keep the operating area clear of all persons.
7. Do not over-reach or stand on unstable support. Keep good footing and balance at all times.
8. Follow the maintenance instructions specified in the manual.
9. This pressure washer is provided with a Ground Fault Circuit Interrupter (GFCI) built into the power cord plug. If replacement of the plug or cord is needed, use only identical replacement parts.
10. **WARNING!** Never direct the water jet towards people, pets, electric wiring, or the machine itself.
11. **WARNING!** Never try to clean clothes or footwear on yourself or other persons.
12. Wear eye protection during operation.
13. Never work barefoot or with sandals.
14. **WARNING!** The operator and anyone in immediate vicinity of the cleaning site should protect himself from being struck by debris dislodged during cleaning operations.
15. The machine should be placed as far away from the cleaning operation as practical.
16. Only trained personnel, familiar with this manual should operate the machine.
17. Don't start the machine until the high pressure hose has been securely attached.
18. The spray handle and lance are affected by thrust during operation - Always hold the spray lance firmly with both hands.
19. When the machine is not in use, the spray handle trigger should be locked.
20. Activate the trigger **only** by hand. Never tie or wedge it open in any other way.
21. Avoid damage to the high pressure hose (such as running over it with vehicles, squeezing, pulling, knots/kinks etc.) and keep it away from oil and sharp or hot objects. Failure to protect the hose may cause it to burst.
22. Never detach the high pressure hose when the water temperature is above 120°F (risk of scalding) or while the machine is in operation. Disconnect the power and the inlet water connection before detaching the high pressure hose.
23. Never tug the power cord to disconnect the plug from receptacle.
24. Always disconnect the plug from receptacle prior to disconnecting any extension cords.
25. Avoid damage to the power cord (such as running it with vehicles, squeezing, pulling, knots etc.) and keep them away from sharp or hot objects.
26. *Never* use the machine in an environment where there could be a danger of explosion.



27. **WARNING!** The integrity of high pressure hoses, nozzles and connections are important for safety when operating the machine. **Only** use the high temperature high pressure hoses (with an imprinted max. temperature of **150°C**), nozzles and connections prescribed by ALTO.
28. For safety reasons only use original KEW Technology accessories and spare parts.
29. In freezing conditions, never start the machine until it, and the hoses and accessories have thawed. Otherwise the machine could be damaged.
30. The machine should not be covered during operation.
31. The combustion gases from the burner are *dangerous to humans and animals*. Always ensure adequate ventilation during indoor operation.
32. **WARNING!** Using the wrong fuel can be hazardous!
33. The machine must be turned off when not in use.

### SAVE THESE INSTRUCTIONS

#### 2.1 Unpacking

Once the pressure washer has been taken out of the packaging, check that it is complete and without any defects; if in doubt, the pressure washer should not be put into use and you should contact the nearest ALTO service organization.

#### 2.2 Startup

##### **Check the power cord**

The insulation of the power cord should be faultless and without any cracks.

Please contact a qualified electrician or the nearest ALTO distributor if it is not so.

##### **Check the voltage**

Check that the voltage stated on the model tag corresponds to your receptacle.

##### **Power consumption, fuse/breakers**

Check the power consumption stated on the model tag and check for correct fuse/breaker.

#### - WARNING -

If these Instructions aren't followed, it may be dangerous to use your pressure washer.



### GROUNDING INSTRUCTIONS



This product must be grounded. If it should malfunction or break down, grounding provides a path of least resistance for electrical current to reduce the risk of electric shock. This product is equipped with a cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into an appropriate outlet that is properly installed and grounded in accordance with all local codes and ordinances.

**DANGER** - - Improper connection of the equipment-grounding conductor can result in a risk of electrocution. Check with a qualified electrician or service personnel if you are in doubt as to whether the outlet is properly grounded. Do not modify the plug provided with the product - if it will not fit the outlet, have a proper outlet installed by a qualified electrician. Do not use any type of adapter with this product.



### EXTENSION CORDS



Use only 3-wire extension cords that have 3-prong, grounding-type plugs and 3-pole cord connectors that accept the plug from the product. Use only extension cords that are intended for outdoor use. These extension cords are identified by a marking "Acceptable for use with outdoor appliances; store indoors while not in use". Use only extension cords having an electrical rating (volts AND amps) not less than the rating of the product. Do not use damaged extension cords. Examine extension cord before using, and replace if damaged. Do not abuse the extension cord and do not yank on any cord to disconnect. Keep cord away from heat and sharp edges. Always disconnect the extension cord from the receptacle before disconnecting the product from the extension cord.



### GROUND FAULT CIRCUIT INTERRUPTER PROTECTION



This pressure washer is provided with a Ground Fault Circuit Interrupter (GFCI) built into the plug of the power supply cord. This device provides additional protection from the risk of electrical shock. Should replacement of the plug or cord become necessary, use only identical replacement parts that include GFCI protection.

**WARNING** - - To reduce the risk of electrocution, keep all connections dry and off the ground. Do not touch the plug with wet hands.



### FIRE DANGER

- \* Always place the machine at a distance of at least 3 feet from buildings or equipment during operation.
- \* Never place flammable products (e.g. gasoline, thinner, etc.) or combustible materials (e.g. wood, paper, cloth, etc.) near the machine during operation.
- \* Never place the machine in the immediate vicinity of heat sources (furnaces, heaters etc.).

## 2.3 General

1. DO NOT clean asbestos-bearing surfaces with this machine, unless using special equipment in accordance with appropriate regulations,
2. Never touch plug and receptacle with wet hands.
3. **WARNING!** This machine has been constructed for use with "normal" detergents. The use of aggressive detergents or chemicals may cause operating and safety problems.
4. When using detergents, the instructions should always be strictly observed.
5. Always unplug the machine before cleaning or maintenance of the machine.
6. Don't use the machine if the power cord or important parts of the equipment are damaged - i.e. safety devices, high pressure hoses, spray handles, cabinet.
7. If the power cord is damaged, it should be replaced by a ALTO trained service technician or a qualified electrician to avoid a hazardous situation.
8. The owner and operator are obliged to observe any working environment or working safety regulations concerning the operation of this high pressure washer.

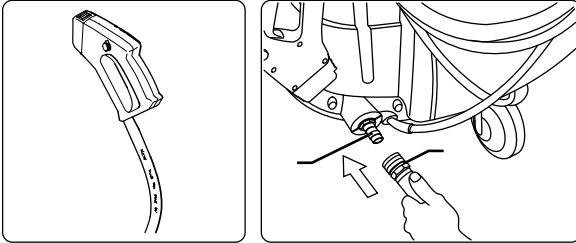
**SAVE THESE INSTRUCTIONS**



## 3.0 Operating instructions

### 3.1 Connections

#### 1. High pressure hose

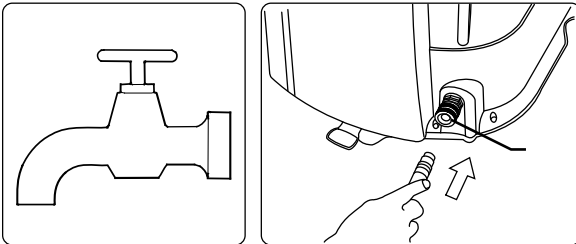


**Only use KEW Technology high pressure steam-capable hoses with an imprinted max. temperature of 150°C.**

*Max. length of extension hose: 33 ft.*

The high pressure hose with imprinted max. working pressure and temperature (**150°C**) should be attached to outlet socket (1) using the quick coupler (6). The total length of the high pressure hose must not exceed 66 ft.

#### 2. Inlet water connection

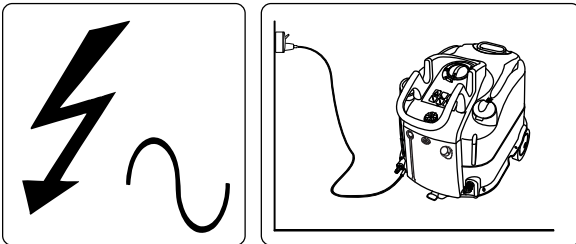


*Min. length/i.d. of hose: 20 ft, ½".*

*Clean water inlet screen at least monthly  
Max. inlet water pressure 150 psi.*

Let water run through the inlet hose to flush any impurities, and clean coupling parts before connecting the supply hose. Attach the inlet water hose to the quick coupling part (2) of the water inlet. The water supply system must supply at least 200 gal/hr (3.2 gpm). If there is a risk of sand in the inlet water (i.e. from your own well), a sand filter should be mounted. Please contact your ALTO distributor for further information.

#### 3. Power connection

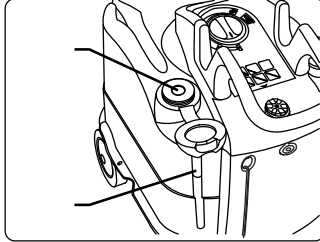


*Only connect to an approved receptacle with grounding conductor.*

Uncoil the power cord before running the machine.

Check voltage, fuse, cords and extension cords according to section »2.1. Start-up«.

## 4. Refueling



Use clean heating oil or diesel fuel

**WARNING! Using the wrong fuel can be hazardous!**

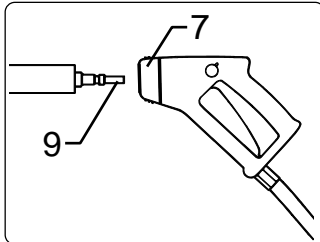
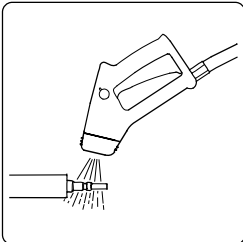
Capacity of tank: 4 gal.

Filling of fuel for the burner through the filler opening (4). Capacity of tank: 4 gal. Only use clean heating oil, diesel fuel, or kerosene.

The fuel level can be read on the level indicator (5).

If the burner stops unintentionally, check the fuel level in the tank and if necessary, refill (at least 2 gal). To protect the life of the fuel pump, it is important that the machine is not allowed to run without fuel in the tank.

## 5. Spray handle - accessories



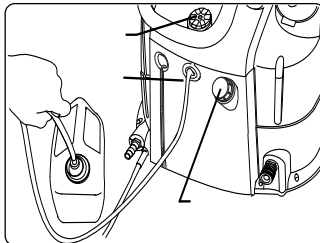
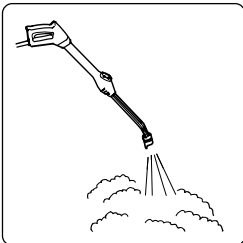
Clean quick-connect nipple each time the spray lance has been detached.

Pull the grey quick coupler release (7) forward.

Insert the nipple of the spray lance (9) in the quick coupling and release #7.

Tug on the spray lance or other accessory to ensure it's securely mounted, before starting the machine.

## 6. Detergents - metering unit

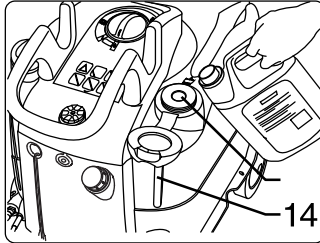


Only use "normal" detergents. Use of aggressive detergents may damage equipment and affect the environment.

Flush with clean water after use.

Detergents can be added under *low pressure* through the built-in metering system (10). Tip the cover (11) out until it stops, and place a container in the holder. Drop the suction hose (12) and filter of the metering unit into the container and close the cover/holder. Metering is infinitely variable (range 0-5), and the required dilution is achieved by turning the knob counter-clockwise, until the required step is against the arrow on the control panel. Max. rate is approximately 5% (25:1). Once detergent application is completed for the day, the system should be flushed through with clean water at Step 5, for approximately 1 min. The knob should then be turned clockwise to Step 0.

## 7. Scale prevention - No Scale

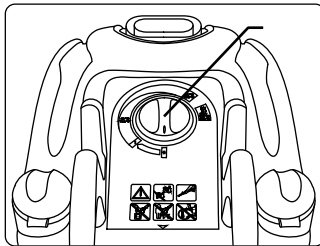
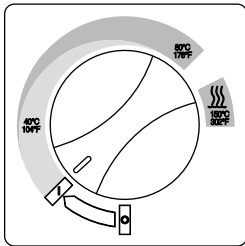


Indicator is light: insufficient "No Scale"  
Indicator is dark: sufficient "No Scale"

Only use "No Scale" of KEW Technology.

To avoid scaling of the burner coil, and thus ensure optimum operation, a scale preventer - "No Scale" should be added. This product is available from your ALTO distributor. Fill through the socket (13) and it will automatically be added to the water at the proper rate. If you're out of "No Scale", you'll be able to tell from the level indicator (14).

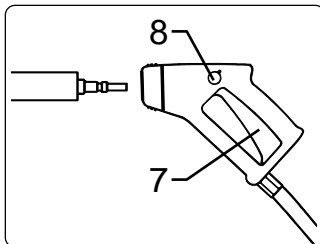
## 3.2 Start-up procedure



Turn control knob to position - I -.

Turn on the water and turn control knob (16) to position - I -. In this position the machine is ready for cold water operation.

## 3.3 Operation



Always hold the spray lance with both hands!

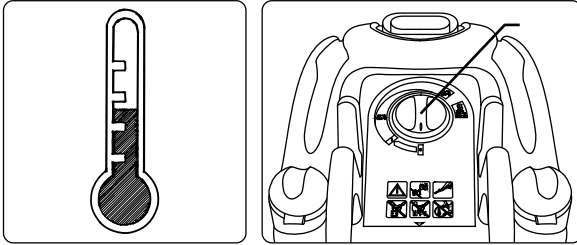
Always lock the spray handle when the machine is not in operation.

Activate the high pressure washer by squeezing the trigger of the spray handle (7). When first starting, the pressure may fluctuate because of air in the system. Once the air has escaped, the pressure will become steady. If necessary, let the machine operate without the spray lance until all air is purged from the inlet water hose, the pump, and the burner coil.

When the cleaner is not in use, secure the spray handle by turning the locking device (8) into pos. 0.

**NOTE:** This machine features an automatic start/stop function. When the spray handle trigger is released, the machine will automatically stop. The machine can be restarted with a simple squeeze of the spray handle trigger.

### 3.4 Temperature control



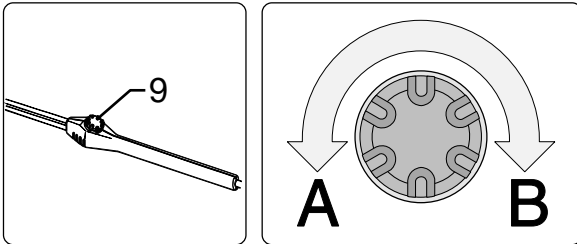
<i>Cold water mode</i>	34 - 104°F
<i>Hot water mode</i>	104 - 176°F
<i>Steam mode</i>	302°F

Choose the desired temperature with the control knob (16).

Note: If the machine is put away immediately after hot water or steam operation, it should be cooled in “cold water” operation until the temperature is below 120°F. This will take approximately 2 minutes.

**IMPORTANT (only 30HA Master):** Adjustment to temperatures above 176°F should be made with the trigger released. When choosing temperatures above 176°F (steam operation) *the water volume is automatically reduced*. Then *full water volume* for cold water or hot water operation cannot be obtained until the temperature of the outlet water has fallen below 176°F. Once the temperature is below 176°F, release and squeeze the trigger to return to full water volume again. The cooling period, from max. temperature (302°F) to full water volume is approximately 1 minute.

### 3.5 Spray lance, pressure regulation, how to use detergents



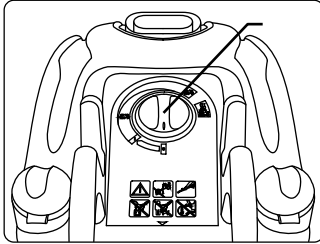
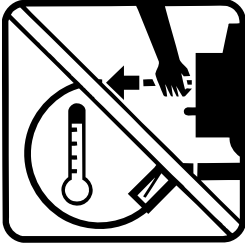
*Turn pressure reducing valve:*

*Clockwise (B): for high pressure*

*Counter clockwise (A): for low pressure and detergent application*

The spray lance features a high pressure nozzle and a low pressure nozzle. When the pressure reducing valve (1) is completely closed (clockwise - B), only the high pressure nozzle is used and you're in the “**high pressure mode**”. When the pressure reducing valve is open (counter clockwise - A), both nozzles are used and you're in the “**low pressure mode**” (where you can also add detergents). The pressure may be infinitely varied between “full” and “low”.

## 3.6 End of operation

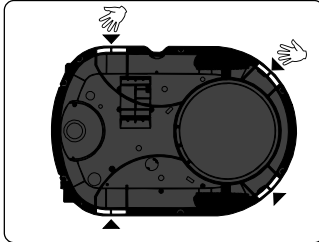
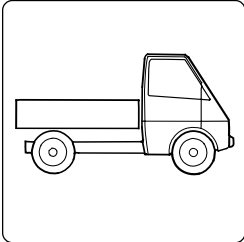


### **Danger of scalding!**

Never detach the high pressure hose when the water temperature is above 120°F.

Turn the control knob (16) to position “cold water” (in the blue sector) and squeeze the trigger until the temperature is below 120°F. The cooling period from 176°F to 120°F is approx. 2 min. Then, turn off the water supply and stop the machine by turning the control knob (16) to position - **O** -. Now the high pressure hose can be detached.

## 3.7 Transportation



*If lifting with a crane, use lifting straps!*

### *Lifting manually:*

When lifting the machine manually, lift at the lifting points ▼ marked on the fenders in front of the wheels, and on the side at the back of the machine.

### *Lifting by crane:*

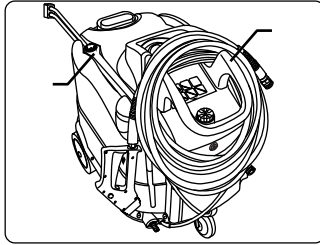
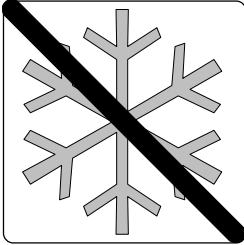
When lifting the machine by crane, lifting straps should be used.

Cross the straps diagonally under the machine. *Never* lift the machine by the handle (17).

### *Transport on a vehicle:*

Always transport the machine in upright position. Apply the caster wheel brake (19) and secure the machine with straps or rope during transport.

## 3.8 Storage



*Frost-free room or anti-freeze solution!*

We recommend you to store the machine in a frost-free room between cleaning tasks. The machine must be emptied of water prior to storing for a longer period. This is done as follows:

1. Detach the inlet water hose. Detach and drain the spray lance.
2. Start the machine, and let it run with open spray handle until all water has run out.

If the storage area is not frost-free, the machine should be protected with an anti-freeze solution. Contact your distributor for further information about the anti-freeze equipment of KEW Technology. Follow the instructions provided with the anti-freeze equipment.

Coil the high pressure hose and allow the quick-connect end to lie on the floor. Holding the coiled hose at waist level, squeeze the trigger to drain the hose and spray handle. Coil the power cord. Place them on the handle (17). The spray lance can be stored in one of the holders (18) on each side of the machine.

## 3.9 Safety devices on the machine

### **Motor protection:**

The machine features an overcurrent release built into the electrical system which will stop the machine if the motor and/or pump are overloaded. The machine can only be restarted after it cools. Use that time to find the reason for the overloading!

### **Pump:**

The pump is equipped with a combined “unloader” and automatic start/stop valve system. The unloader automatically relieves the pump load when the trigger is released and stops the motor. This ensures that the water is not circulated and heated inside the pump. The machine will re-start when you squeeze the trigger.

The pump also features a safety valve ensuring that the pressure in the pump will never exceed the value adjusted from the factory. The safety valve is sealed and should only be adjusted by a trained service technician.

### **Thermostat:**

The discharge water temperature is controlled by a mechanical thermostat. The thermostat is calibrated from the factory and must not be re-adjusted. The thermostat unit also controls the heating stage function.

### **Safety thermal breaker:**

The safety thermal breaker is a temperature sensor of the manual-reset type. The sensor is placed on the inlet side of the burner coil and interrupts the supply of fuel oil and No Scale if the water temperature exceeds 140°F at this point. Once it trips, it must be reset manually. Until the cause is found, the machine can still be operated in the cold water mode.

## 4.0 Applications and working methods

### 4.1 Applications

Typical applications for this product are:

<b>Agriculture</b>	Cleaning machinery, implements, stalls, and buildings
<b>Transport</b>	Cleaning vehicles, engine rooms, and large parts
<b>Construction</b>	Building renovation and maintenance, cleaning vehicles and equipment
<b>Industry</b>	Degreasing and cleaning of machines, tooling and vehicles.
<b>Service</b>	Contract cleaning of vehicles, public facilities, and many degreasing tasks.

### 4.2 Working pressure

The machine may be used with high or low pressure at your own option. Using the standard spray lance, working pressure is adjusted by turning the reduction valve.

<b>Low pressure</b>	Is first and foremost used for application of detergents and for rinsing.
<b>High pressure</b>	Is used for agitation cleaning.
<b>Intermediate pressure</b>	Typically used for the cleaning of surfaces, which cannot tolerate the powerful water jet provided at the high pressure setting (e.g. soft surfaces, decals, etc.).

### 4.3 Detergents

The most efficient cleaning is obtained with detergents in combination with hot water and high pressure cleaning. There are products available specially developed for high pressure cleaning, and some are designed for hot water use, as well. A professional chemical supplier can assist you with your choices. Detergents or other chemicals with a pH above 9 or below 5 are generally considered “aggressive” and may be harmful to your machine if not properly used.

Contact your ALTO distributor for assistance in choosing a suitable detergent for your requirements. The method of application and the dilution of the individual products will be provided by the product labels or the data sheet (MSDS). Metering is performed by the metering unit pressure washer.

### 4.4 Metering detergents

The pressure washer features a built-in injector enabling metering detergents when the machine is in the low pressure mode. With this metering unit, it is possible to vary the dilution of detergents infinitely between approximately 0-5%. Thus, most cleaning jobs will be covered (also see Section 3.1.6). To convert “ounces per gallon” to percentage, *divide the ounces required by 1.28*.

To change from detergent application under low pressure, to cleaning under high pressure, simply turn the regulating from “low pressure mode” to “high pressure mode” on the spray lance. You will not have to attach or detach any parts or accessories.

For foam cleaning you will have to mount the special Foam Injector between the pressure washer and the high pressure hose. Insert the pickup hose of the injector into the foam detergent. Snap the Foam Lance accessory onto the spray handle and you are ready for foam application. After the application, *dismount the Foam Injector* and replace the Foam Lance with the standard spray lance, and you are ready for high pressure cleaning.

### 4.5 Working methods

Your high pressure washer has been developed for cleaning according to the so-called „2-step method“.

STEP 1	Application of detergent
STEP 2	High pressure cleaning

In practice the working process is dictated by the actual job, but as a starting point, the following working method can be described:

1. **Apply detergent under low pressure** and to a dry surface. The dilution is chosen according to the job, and the adjustment is made on the metering unit.
2. **Allow some time for the detergent to work.** Let the detergent act on the dirt/surface for a short time (but don't let it dry) prior to pressure cleaning - usually a few minutes.
3. **High pressure agitation.** Clean all surfaces under high pressure.
4. **Rinse with fresh water afterwards, if necessary.** To make sure that soil and detergents are removed from the surface.

Optimum cleaning results will be achieved by following these 3 simple Tips:

#### **Tip no. 1**

When using a detergent, always apply it on a dry surface. If the surface is rinsed with water at first, it may be difficult for it to absorb the detergent, and the result is a reduced effect of the detergent.

#### **Tip no. 2**

When applying a detergent on large vertical surfaces (i.e. the sides of a truck) work from the bottom - up. You will avoid detergent running down the surface and forming dark streaks on the surface

#### **Tip no. 3**

During the high pressure cleaning activities, work so that the high pressure water does not run over the surface which has not been cleaned yet (Once again, from the bottom - up). This is to ensure that there is detergent on the surface being cleaned when the high pressure water is applied.

## 5.0 Disposable waste

This high pressure washer consists of parts which can damage the environment if they are not properly disposed of. They include the following:

Oil, painted/zinc-coated parts, plastics/plastic-coated parts.

Therefore, it is important to follow the laws concerning disposal of polluting and/or environmentally dangerous materials when replacing spare parts or disposing of high pressure washer. It is recommended that you take these parts to waste disposal areas or recycling plants that are approved by the state for the disposal of these types of materials.



## 6.0 Maintenance

### 6.1 General

To ensure that your ALTO high pressure washer is always in an operational condition it is advisable to have it checked by an ALTO service technician at regular intervals. However, with respect to exposed components, a minimal maintenance program helps ensure a prolonged and problem-free operation. Therefore, it's a good idea to make a habit of the following:

- Before attaching the inlet water or high pressure hose, the quick couplers should be free of dirt and sand.
- Before attaching the spray lance or any other accessory on the spray handle, the machine should be started and the quick couplers rinsed.
- After detergents are used, the injector system should be flushed with water to avoid clogging the system.
- The inlet water screen should be cleaned once a month or more frequently as required.
- We recommend you to store the machine in a frost-free room. If the machine freezes up by mistake, it must not be started. Thaw the machine, hoses and accessories before starting. If the room is not frost-free the machine should be protected with anti-freeze. See section »3.8 Storage - frost protection«.
- Replace the fuel filter every 6 months, or more frequently as required.

### 6.2 Descaling the coil

If your water supply is "soft" or "normal", descaling may never be required if you use NoScale. If you have "hard" water, the machine should be descaled at least once the year or more often in extreme cases. Scale deposits in the spray lance or reduced heating output are indications that descaling is required.

Descaling is performed as follows:

1. Detach high pressure hose.
2. Turn on the inlet water.
3. Insert the suction hose for the detergent (12) in a container with descaling acid.
4. Adjust the metering unit to step 5 (see section 3.1.6).
5. Start the machine in cold water mode.
6. Stop the machine when the water escaping the outlet socket has been coloured by the descaler.  
**Warning: The mixture will be caustic!**  
Don't empty the descaler container completely to prevent air from getting into the system.
7. Let the machine stand for 20 minutes.
8. Place the metering unit suction hose (12) in a container of clean water.
9. Start the machine and let it run 5-10 minutes to flush the descaler out of the system.
10. If required, repeat the procedure from item 3-9.
11. Adjust the metering unit to step 0, and the machine is ready for operation.

**Note:** The descaling should always be carried through in accordance with the product instructions.

### 6.3 Clearing the high pressure nozzle

A clogged up nozzle causes excessive pump pressure and clearing is required immediately.

1. Stop the machine and detach the spray lance.
2. Clear the nozzle with KEW Technology nozzle clearing tool (no. 6401654), or a straightened paper clip.  
**IMPORTANT: ONLY use the clearing tool with the spray lance detached from the machine!**
3. Flush the spray lance backwards with water.
4. Repeat items 1-3 if the pressure is still too high,

## 7.0 Troubleshooting chart

You have chosen the best quality and deserve the best performance. To speed returning the machine to service, check the following before contacting the nearest ALTO service organization:

Fault	Cause	Correction
<b>Machine will not start</b>	Fuse/breaker blown Cord not connected Defective extension cord Defective receptacle	Replace/Reset Connect power cord Try without extension cord Try another receptacle
<b>Machine stops unintentionally</b>	Excess-current cut-out on start/stop button activated <i>-restart possible after 60 sec.</i>  1) Wrong voltage  2) Extension cords too small  3) Nozzle partly blocked  Fuses blow	Allow the button system to cool. Check the following items 1-3 and then restart the machine.  Check that the supply voltage corresponds to the data plate (see sec. 1.1)  Remove extension cord or use correct cord size spec (see sec. 2.1)  Clear the nozzle (see sec. 6.3)  Check that the installation provides the ampere required by the machine. Check for anything else loading the circuit (ie. Heater, coffee pot)
<b>Pressure fluctuating and pulsating</b>	Water supply too low  Inlet water screen clogged	Check the water supply (min. 3 gpm). Avoid long, thin hoses (min. ½"). Clean the screen (see sec. 6.1)
<b>Pressure varies from max. to min.</b>	Nozzle partly blocked High pressure hoses too long Scale deposits in burner	Clear the nozzle (see sec. 6.3) Detach high pressure extension hoses and retry. Extension hose max. 33 ft. Descale coil (see sec. 6.2)
<b>No working pressure</b>	Nozzle clogged No inlet water Hoses/spray lance frozen	Clear the nozzle (see sec. 6.3) Check inlet water Let them thaw
<b>The burner does not ignite</b>	Safety thermal breaker activated  Fuel tank empty  Fuel filter blocked	Serious fault in the burner/control system. Send for an ALTO service technician. (The machine can still be used in the cold water mode.) Fill with at least 2 gal. The machine must not run without fuel ! Clean or replace the filter (see sec. 6.1)
<b>Heavy black smoke</b>	Burner air or fuel improper	Obtain service.
<b>Insufficient heating</b>	Scale deposits in coil Burner out of adjustment	Descale coil (see sec. 6.2) Obtain service.

Should malfunctions occur than those mentioned above, please contact the nearest ALTO service organization. If you don't know how to contact your selling or nearest distributor, call

**ALTO Technical Support:**

Phone: 1.800.331.7691

